

Docket No.: 241784US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF:  
Seiji AIDA

GROUP: 1714

SERIAL NO: 10/646,820

EXAMINER: SHOSHÓ, C.

FILED: August 25, 2003

FOR: AQUEOUS PIGMENT DISPERSION, INKJET INK  
AND PROCESS FOR PRODUCING AQUEOUS  
PIGMENT DISPERSION

DECLARATION UNDER 37 C.F.R. 1.132

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

Sir:

I, Seiji AIDA, declare and state as follows:

1. I obtained my bachelor's degree in the Faculty Engineering, the Department of Applied Chemistry, at Saitama University in March 1993. I have been employed by TOYO INK MFG. CO., LTD. since April 1993, where I have been engaged in the research of pigments and ink jet inks.
2. I am familiar with the prosecution of the above-identified application. I have read and understand the claims and specification of the above-identified application and I have read the prior art cited against the claims in the Office Action of December 14, 2005.
3. The following experiments were conducted by me or under my direct supervision and control.
4. I have conducted a comparison of the performance of ink jet inks disclosed in Nadolsky et al. and an ink jet ink of the present invention to clarify the superiority of the ink jet ink of the present invention.

Experiments

(Preparation of an aqueous dispersion of a monoalkyl maleate graft polymer of a maleic anhydride /  $\alpha$ -olefin copolymer)

This preparation was conducted in accordance with example 1 from U.S. Patent No. 6,841,592 (Nadolsky et al.). Namely, a 400 ml beaker equipped with a magnetic stirrer was charged with 150.7 g of deionized water, and 12.9g of diethylaminoethanol and 36.4 g of CERAMER 1608 were then added. The mixture was heated to 80 to 90°C under stirring, and stirring was then continued for 2.5 hours at this temperature. Following cooling, additional deionized water was added to make the weight of the mixture up to 200 g. The resulting solution was then filtered through 5  $\mu$ m and 1  $\mu$ m filters, and then used in the following ink formulations.

(Preparation of Ink A)

The components listed below were mixed together in a high-speed mixer and then filtered through a 1  $\mu$ m membrane filter, yielding an ink A.

Liojet Cyan Base (an aqueous pigment dispersion, manufactured by Toyo Ink Mfg. Co., Ltd.)	20 parts
The graft polymer aqueous dispersion prepared above	10 parts
Diethylene glycol monobutyl ether	15 parts
Deionized water	55 parts

(Preparation of Ink B)

With the exception of replacing the diethylene glycol monobutyl ether with dipropylene glycol, an ink B was prepared in the same manner as the ink A.

(Preparation of Ink C)

With the exception of replacing the diethylene glycol monobutyl ether with propylene glycol, an ink C was prepared in the same manner as the ink A.

## (Evaluation of Performance)

The performance of the above inks A, B and C as ink jet inks was determined by evaluating the discharge characteristics, the water resistance, and the fixation properties of each ink.

### <Discharge Characteristics>

Each ink was printed onto digital proof paper (DPP-G-914, manufactured by Roland DG Corporation) in a 5 m continuous print recording, using a Hi-Fi Jet Pro FJ-400 printer (a wide format ink jet printer, manufactured by Roland DG Corporation), and the printed image was inspected for missing dots. The number of nozzles that produced missing dots was calculated as a percentage of the total number of nozzles, and the discharge characteristics were then evaluated as good (O) for a result of 0%, fair ( $\Delta$ ) for a result of 0 to 5%, and poor ( $\times$ ) for a result exceeding 5%.

### <Water Resistance>

Each ink was printed onto photocopy paper (4024, manufactured by Xerox Corporation) using a Hi-Fi Jet Pro FJ-400 printer (a wide format ink jet printer, manufactured by Roland DG Corporation), and after standing for a fixed period at an air temperature of 25°C and a humidity of 50%, the printed image was immersed in tap water, and the degree of bleeding of the image was observed. An ink for which the printed image did not bleed even on immersion immediately following printing was evaluated as good (O), an ink for which the printed image ceased to bleed on immersion after standing for 1 hour was evaluated as fair ( $\Delta$ ), and an ink for which the printed image continued to bleed on immersion even after standing for 1 hour or more was evaluated as poor ( $\times$ ).

### <Fixation>

Each ink was printed onto glossy PET film (PET-G-1050, manufactured by Roland DG Corporation) using a Hi-Fi Jet Pro FJ-400 printer (a wide format ink jet printer,

manufactured by Roland DG Corporation), and after standing for a fixed period at an air temperature of 25°C and a humidity of 50%, the fixation of the ink was evaluated using a rubbing tester (model AB301, manufactured by Tester Sangyo Co., Ltd.) to conduct a rubbing test, which involved rubbing a test cloth 100 times back and forth over the printed image with a loading of 200 g. An ink for which the printed image was not rubbed off when the rubbing test was conducted 1 hour after the completion of printing was evaluated as good (O), an ink for which some sections of the printed image were rubbed off when the rubbing test was conducted 1 hour after the completion of printing, but for which the printed image was not rubbed off when the rubbing test was conducted 24 hours after the completion of printing was evaluated as fair (Δ), and an ink for which sections of the printed image were rubbed off even when the rubbing test was conducted 24 hours or more after the completion of printing was evaluated as poor (x).

The results of evaluating the ink A, ink B and ink C are shown below in Table 1. The ink A is corresponding to the ink of the present invention, the ink B and ink C are corresponding to the ink disclosed in the Nadolsky et al.

Table 1

	Ink A	Ink B	Ink C
Discharge characteristics	O	x	x
Water resistance	O	Δ	Δ
Fixation	O	Δ	Δ

5. It is my opinion that the ink jet ink of the present invention exhibits significantly superior performance as an ink jet ink when compared with the ink jet inks disclosed in Nadolsky et al.

6. The undersigned petitioner declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

Further deponent saith not.

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Seiji Aida  
Signature Seiji AIDA  
May 31, 2006  
Date